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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
ANYA, CHARLES E	
ART UNIT	PAPER NUMBER
2194	

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/928,115

Applicant(s)

HOYLE, STEPHEN L.

Examiner

Charles E. Anya

Art Unit

2194

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 4/28/05.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-19 are pending in this application.

Claim Objections

2. Claims 2-7,9-13-16 and 14-19 are objected to because of the following informalities: The above listed claims appear to include typographical errors. Specifically on line 1 of claims 2-7,9-13-16,18 and 19 the term "A" seems to have been used in error.

For the purpose of this office action the Examiner would change the term "A" to "The".

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claims 1,8,14 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

The following terms lack antecedent basis:

- i. "the synchronization object" on line 10,14 and 16 of claim 1.

For the purpose of this office action the Examiner would change the term "the synchronization object" to "the global synchronization object".

- ii. "queue" on line 13 of claims 1 and 8.

For the purpose of this office action the Examiner would change the term "queue" to "the queue".

- iii. "the synchronization object" on line 9 of claim 8.

For the purpose of this office action the Examiner would change the term "the synchronization object" to "the global mutexes".

- iv. "the object" on lines 8,9 of claim 14 and lines 10,11 of claim 17.

For the purpose of this office action the Examiner would change the term "the global synchronization object".

The phrase "temporarily blocking threads" on lines 12 and 14 of claims 12 and 17 respectively does not specifically **exclude** the thread requesting for ownership of the local synchronization object/global synchronization object. The Examiner suggests that the phrase "temporarily blocking threads" be change to "temporarily blocking other threads".

As per Applicant's inclusion of parenthesis on lines 9,19 of claim 14 and lines 11,21 of claim 17, it is not clear as to whether the terms in the parenthesis are intended to be part of claim or not. Examiner's suggests that the Applicant rewrite the phrase "if the global synchronization object is not free (owned or in transition)" as follows: "if the global synchronization object is not free or owned or in transition".

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-4 and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,823,511 B1 to McKenney et al. in view of U.S. Pat. No. 6,353,869 B1 to Ofer et al.

7. As to claim 1, Mckenney teaches a multi-computer system having provision for global synchronization objects comprising: a plurality of multi-processor nodes each having provision for local memory, threads, and an operating system having the ability to manage local synchronization objects (figure 1 Col. 5 Ln. 13 - 47, Col. 6 Ln. 62 - 65, Col. 7 Ln. 1 - 2); global memory accessible to the processors on all the nodes and having at least one spinlock (Local Memory 26 Col. 5 Ln. 45- 48, Col. 8 Ln. 27 - 34); a data structure in the global memory accessible by all the processors wherein one or more records for global synchronization objects may be established (Local Memory 26 Col. 5 Ln. 45 - 48, Col. 8 Ln. 27 - 34), and a synchronization software system of programs established in all the nodes which, at the request of a thread running on a node, can create, open, request, release, and close a global synchronization object, using the spinlock and the data structure ("...functions or primitives..." Col. 7 Ln. 18 - 28), and using local synchronization objects created by the local operating systems on nodes having threads awaiting access to resolve requests for the global synchronization object between threads residing on the same node (Table 1 Col. 7 Ln. 38 - 61).

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8. McKenney does not explicitly teach a data structure including provision for recording in a queue the identity of nodes having threads awaiting access to the global synchronization object and the queue of node identities to resolve requests for the synchronization object as between threads residing on different nodes.

9. Ofer teaches said data structure including provision for recording in a queue the identity of nodes having threads awaiting access to the synchronization object/and the queue of node identities to resolve requests for the global synchronization object as between threads residing on different nodes (Lock Request Queue 46 Col. 6 Ln. 36 - 41, Queue 46A Col. 9 Ln. 66 - 67, Col. 10 Ln. 1);

10. It would have been obvious to one of ordinary skill in the art the time the invention was made combine the teachings of Ofer and McKenney because the teaching of Ofer would improve the system of McKenney by synchronizing accesses to shared resource via lock request queue such that data consistency is provided (Col. 6 Ln. 21 - 23).

11. As to claim 2, Ofer teaches the multi-computer system in accordance with claim 1, wherein the queue in which is recorded the identity of the nodes having threads awaiting access to the global synchronization object is organized as a FIFO arrangement of the node identifiers ordered in the same order in which requests for the global synchronization object are received from the threads (figure 4B Col. 10 Ln. 7 - 16).

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12. As to claim 3, Ofer teaches the multi-computer system in accordance with claim 2, wherein node identifiers are moved to the end of the queue each time one of the threads on the correspondingly identified node gains ownership of the local and global synchronization objects (Col. 10 Ln. 13 - 15).

13. As to claim 7, McKenney teaches the multi-computer system in accordance with claim 1, wherein the global synchronization objects are semaphores ("...semaphores..." Col. 7 Ln. 33 - 34).

14. As to claims 8-10, see rejection of claims 1-3 above.

15. **Claims 4-6 and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,823,511 B1 to McKenney et al. in view of U.S. Pat. No. 6,353,869 B1 to Ofer et al. as applied to claim 3 above, and further in view of U.S. Pub. No: 2001/0014905 A1 to Onodera.**

16. As to claim 4, McKenney as modified by Ofer is silent with reference to the multi-computer system in accordance with claim 3, wherein counts are maintained for each node of the number of threads awaiting a synchronization object, wherein those counts are decremented when a thread on the corresponding node is granted the synchronization object, and wherein the reference to the name of the corresponding node in the data structure is removed when the count reaches zero.

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17. Onodera teaches a multi-computer system in accordance with claim 3 wherein counts are maintained for each node of the number of threads awaiting a synchronization object, wherein those counts are decremented when a thread on the corresponding node is granted the synchronization object, and wherein the reference to the name of the corresponding node in the data structure is removed when the count reaches zero (figure 3 (Steps 2060/2080) page 10 paragraph 0106, ("...queue..." (Step 2080) pages 10/11 paragraphs 0106/0117).

18. It would be obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Onodera, McKenny and Ofer because the teaching of Onodera would improve the system of McKenny and Ofer by minimizing the number of memory synchronization commands and by not reducing processing speed attained along a frequent path (page 5 paragraph 0050/0051).

19. As to claims 5,6,11,12 and 13, see the rejection of claim 4 above.

Allowable Subject Matter

20. Claims 14-19 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Response to Arguments

21. Applicant's arguments filed 4/28/05 have been fully considered but they are not persuasive.

Applicant argues in substance that (1) the McKenney prior art reference does not teach a single, global lock device because McKenney teaches several local lock devices, one for each group of several local processors, (2) the Ofer prior art reference does not teach a global control device that is supported by multiple local control devices and (3) the Brenner prior art reference does not disclose how to design a global synchronization object and does not describe its implementation because separate global and local object working together in a synergistic manner is not provided.

Examiner respectfully traverses Applicant argument:

As to point (1), the claim language requires “a data structure in a global memory accessible by all the processors wherein one or more records for global synchronization objects may be established”. The abstract of the McKenney prior art reference at least discloses a shared flag accessible to a process running on any processor in the system. The McKenney prior art also disclose that processes running on different processors could have read or write access to shared objects via locks (Col. 7 Ln. 16 – 24). Figure 5 discloses a data structure that includes reader-writer locks 80a-p that is accessible by plurality of processors (“...any...” Col. 9 Ln. 11 – 16).

As to point (2), the Ofer prior art reference is only used to indicate that the identity of nodes could be stored in a queue of a data structure as claim requires and not to show a global control device that is supported by multiple local control devices as Applicant's argument appears to suggest.

As to (3), Applicant's argument is mute since the related claims are now allowable.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles E. Anya whose telephone number is (571) 272-3757. The examiner can normally be reached on M-F (8:30-6:00) First Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, An Meng-Ai can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Charles E Anya
Examiner
Art Unit 2194



SUE LAO
PRIMARY EXAMINER

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